RECORD

E

65-1

LEO J. HILKEY

GOLDEN VALLEY

SUMMER 1965

NOTEBOOK #1

JUNE 15

LOCALITY 651

L-241

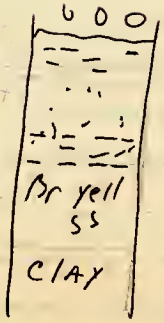
NW, NE, Sec 4, T 139N, R 95W, N. Dak

MATERIAL IN
ABEYANCE

Center of Weldbdg Sec 20 T145N R88W
F. V. S.
n. Mercer Co.

No typical Three handed text
F.V. according to map.

Sec 18 T 145 N R88W.
n. Mercer Co.


600
Br yell
SS
CLAY

n. Mercer Co.

fair exposures of
Lower Mbr. gu. & Fio(?)

T 111

Loc. 656 NW¼, SE¼, Sec 31 T 146 N
R 88 W. n. Mercer Co.

LOC. 657 m. merid.

NE, NE, SEC 36 T 146 N R 90 W

Rd. CUT WITH 25' SEC of

U.M(?) G.V.(?) 10YR 6/2 10YR6/6

bedded & channeled

shales & ~~[illegible]~~

5 YR 7/2 SS. CHANNEL

NON INDURATED & NON-

bedded & NON INDURATED

NON MICACEOUS.

Problematical U.M.G.V.

LOC. 658 NW, NW, SEC 6 m. merid T 146 N R 89 W

Highly channeled seq. of

clays & lignitic clays & some

SS. Color wrong for g.v.

& no lower member seen at

supposed CONTACT.

F.V. HAS br. sands. wh. to

l. grey in place.

[SE, NW, sec 11, T145N R 90 W.
Fairly Good G.V. sections in
A Cliff. sections.?]

Loc. 659 :SE, Sec 21 T 145N R90W.
A med. grained non mic
lithic l. grey weathering
grey kaolinitic ss. This is
. Fu. Upper part

Loc. 6510 ~~[illegible]~~
Center w. bdy Sec 29, T145N R 90W.
M. Mercer Co.

Center w. Bdy, Sec 11, T 144 N R 91 W. s. Dunn

NW, NW, Sec 11, T 144 N, R 91 W. s. Dunn

NW, NW, Sec 11, T 144N R 91 W. S. Dunn.

F.V. not G.V.

NW, SW, Sec 2, T 144N, R 91W.
S. Dunn Co.

L.M
G.V.
today

NW, NW, Sec 2, T144N, R 91W
S Dunn.

NW, SW Sec 32 T145N
R 90W. in (Vert) Mercer Co.

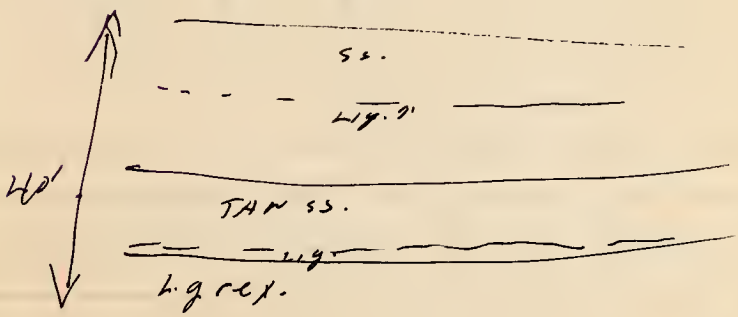
SW, NW.
Sec 32, T145N
R 90W.

6510 NW, SW, Sec 29, T 145N, R 90W. n. Meeh

6514 NW, Sec 30, T 145N, R 90W. n. Meeh G

Good. exposure of much of section at previous stops.

from l. grey weathering ss with orange bands & channeling to tan ss. with both lignite bands. includes a patch of lig at base.



6520 Center s. Bdy SE ¼, Sec 28, T14N, R 9W.
20' channel bedded
5 X 8/1 wh. S/TST & SS
non mic. SS.
could be equated
with l.m. G.V.

capped with friable
clayey SS.

22

150 yds. w. of 8-8-1 SW¼, NE¼, Sec 8, T34N
R. 30W, S. Miller Co.

39
42

All bearings in core

✓ NW, SE, Sec 31, T 146 N
SECTION 656 R 88 W, 5th Mer

Fort Union Fm
Wh color [illegible]
[illegible] 5Y 7/2

Fig SA 10YR 6/2, [illegible]
[illegible] SS
mica 7½%
Joint [illegible] STRIKE
~~[illegible]~~ 160° ~~[illegible]~~ 18°S
Dip
Albert on B.P.S

2' Channel f[illegible] truncates
[illegible] below
nel [illegible] drive
A, [illegible] micaceous
Wh color N9.5
Fr 5Y 6.5/1
[illegible] monite com[illegible]
[illegible] ", bl. bs
[illegible] P.J.
[illegible]
[172° D13°S] 155 - 115 [12° D15°S]

3.5-6.5 A lense of [illegible]
[illegible] of SS
[illegible]
Wh. color N.6.5
Strect Lat. dimension
SS in [illegible] 10YR 6/[illegible]

N — S

6' DO 2'

* [illegible] from [illegible] 8' to STAKE IS 77' [illegible] 3'

Channel of [illegible]

** [illegible] STAKE

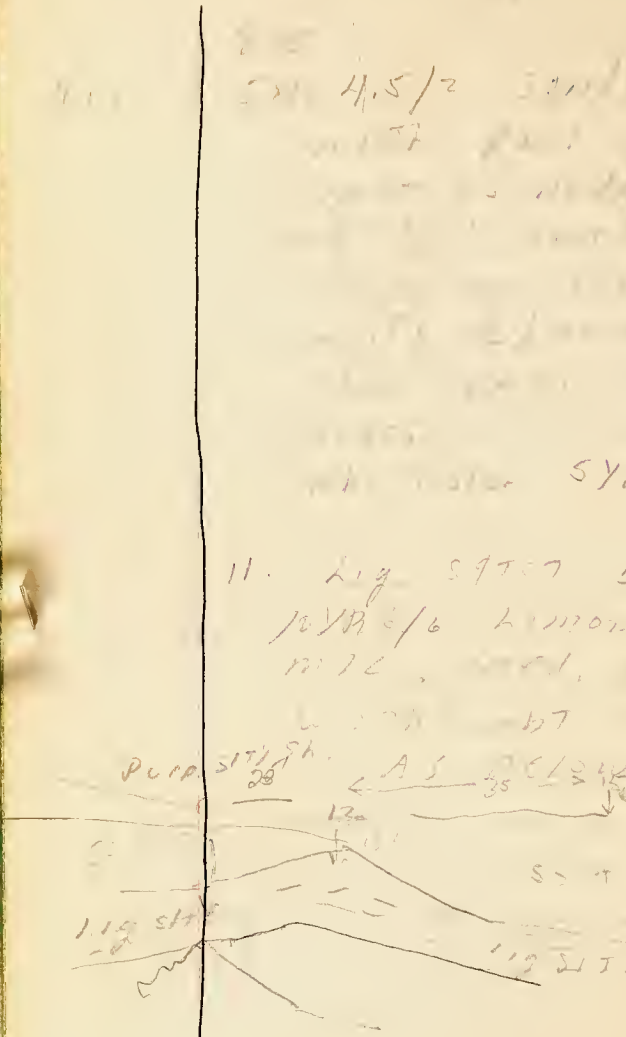
[illegible] AT [illegible] STAKE

[illegible]

N [5 SAT 12, 4] *** S

[illegible]

Log Sh


Purple slate
Lig slate
Lig slate

[illegible]

10'.

[illegible]

AT [illegible] ABOVE 12' STAK[illegible]

[illegible]

[illegible] AT THIS

[illegible] AT BASE of

This [illegible] in places.

[illegible]

[illegible] Cuyahoga City
sh [illegible] 13' below the
[illegible] ONE

Top at 20' at this
stake [illegible] with [illegible] to be
[illegible] at 24½.

21' [illegible] is 40' [illegible]
[illegible]

[illegible]

[illegible] still
silty but with gl.
remains. & carbon blebs.
Large lignite areas.

Golden Valley in

[illegible] silty blocky
[illegible] with rugs of gypsum
[illegible]

Wh.

30' [illegible] THE

31' [illegible]

33' [illegible]

AT THIS STAGE

[illegible]

✓

36 [illegible] 33'

34.5 [illegible] ame [illegible]
45 [illegible]
[illegible] Sh
[illegible]ie Alamo Bluff lg
30' [illegible] channel [illegible] AT
26'

Upper Mbr.
36.5 Covered by Till.

36
[illegible]
[illegible]
45'
48'
51'
54'

[illegible]

51.5 [illegible] 7/5 wh.
[illegible] 11' [illegible] Ended
[illegible] 16 Sh.

54. very plastic clay
same in color as 53.3.
wh. color 5YR 6/2
clay is [illegible]

60' [illegible] hard
clay is [illegible]
[illegible]

wh. color [illegible] 73.7
[illegible]

[illegible]
5YR 6/1
with occ. limonite ledges.

67 [illegible] 5YR 6/6 limonite
[illegible]
sh. same

69. 5 2" limonite ledge
sh. bedded color now
due to ins limonite
5Y 5/6

73.5 [illegible] 5Y, [illegible] clay, calc [illegible]
1/2" m.c., SS
X bedded beds at 27° [illegible]

73.7 Non indurated
non calc equiv of
73.5.

[illegible]75 5Y4/2 270 [illegible]
[illegible] [5Y4/1] somewhat
[illegible] chippy clay.

75 FT. S This unit
AT 75!

79 [illegible] 1/2
very plastic clay
[illegible]

84 Temp top of Sec.
[illegible] A [illegible].
[illegible]

84 Wh Color [illegible] 89 5Y7/2
7Y5/2 Bedded SILTY
20% mic. CLAY WITH
MANGANESE & limon. STAIN

85.4 TRANS. Sh becomes A
SILTST very (3%)
micaceous.

86 5X5/3, fg, SA, 3% mic
UNIND. SS. clayey.

87.2 Very clayey SILTST, 5Y5/2
WITH pods of med SS.

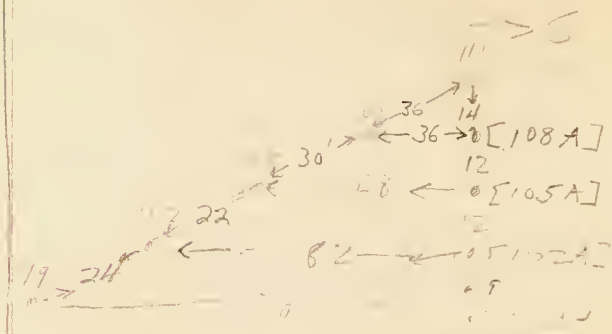
88 Color do 87.2
SILTY CLAY WITH
some TYP. Z carb. blebs.

89 Covered

[Weathered piece of [illegible]
[illegible] IN Surficial
GRAVELS AT 93'
(wh col. ↓ 5Y8/2

89.8 CROSS LAMINATED MICACEOUS
CLAYEY SILT [illegible] mic. on
bp. [illegible] 5Y5/2

Outcrop with 90 - 111
to cover channel
[illegible] pattern
[illegible]



89.5 Cont'd

S. 75°	D 8° N		359°
242	N		36°
286	10° N		30°

93 - 94 - Large spherical
weathered sulphide
now limonite cores
with [illegible]
2 to 8 inch.

94.5 5Y 4.5/1
VERY [illegible]
[illegible]
WITH ABUNDANT [illegible] UNDERCUT
[illegible]
This unit is part of same channel as unit from 89.5
[illegible] color, [illegible]
[illegible] 92.5 zone of small [illegible]
[illegible]

92.5 Underclay, 5Y5/2, very plastic, micaceous 30-120 with vugs of typ. [illegible]
Weathers 5Y8/1

98 New channel lignite
5YR 2/2 lignite with a very irregular trace.
Limonite or pyrite in lign.

Wh color 98.9 - ✓

98.9 A bedded PLASTIC
[illegible] SILT, NON MIC
CLAY with 10YR 6/6
limonite [illegible] on B.P.
9 [illegible]
[illegible] 5Y 5/2

100 Bedded 5Y 5.5/2
with plant fragments.

1.1.3 [illegible]

100.9 Mn [illegible]
stained [illegible]
[illegible]

8 [illegible]

[illegible]
AT 102.3 v.f.g. m [illegible]
[illegible] 5Y 3/2.
SS. some limonite [illegible]
[illegible]
Spherical lim. concs.
[illegible] typ core 2-5"

UNIT grades into SILTST.

106 AN HS LAYER AT base of CHANNEL TRUNCATING CHANNEL below
THE CONTACT IS EXTREMELY [illegible] DISTINCT and [illegible]

MATERIALS [illegible]
peat with [illegible]
[illegible] with [illegible]
[illegible]

SAMPLES 656-1

UNIT replaces lignite which forms upper portion.

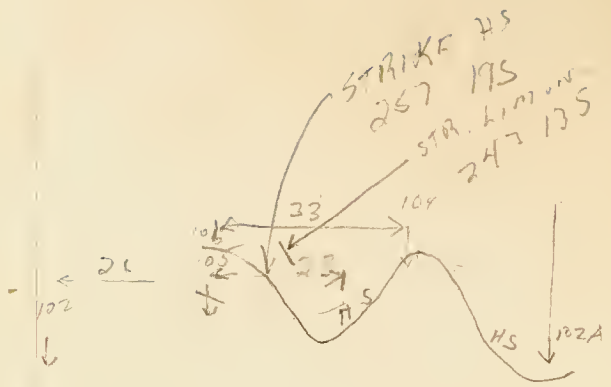
106.3 LIGNITE [illegible]

[illegible] CLAY 5Y 5/2 Fr water gast. pelecy shells

Specs 656b

107 LIMONITE [illegible]
DTRNF 243-135.

107.1 SILTY [illegible] 5Y 5/2 CLAY
WITH OCC. carbonate [illegible]



108 Concretionary [illegible] 6/8

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] 656-2

[illegible]

[illegible]

107.8 [illegible]

[illegible] 5Y5/2 Clay
Slightly [illegible]

04 SITST.

← 111 Covered FIACITIL.

MORE [illegible] ABOVE
[illegible]

HAS SOME [illegible] REMAINS.

106 A. [illegible] LITY AIMON ZONE OF
107.8.

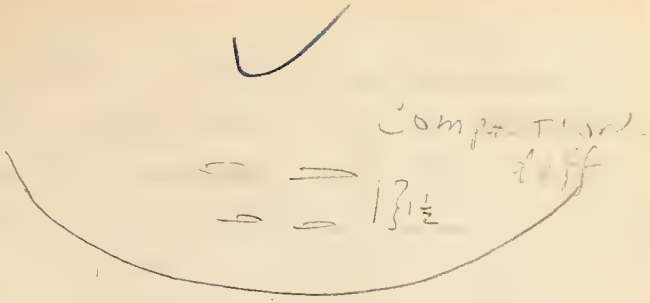
106.3 A Cones & Shale
ISOETITES
L→ [illegible]
[illegible]
106.A HS Dlops

108A BARREN CONC
layer of 107.6
NOW WITH
(SALVINIA) (MONOCOTS)
POOR LEAVES WATER
LILLIES.

FR WATER [illegible]
Shells of 105.4
from [illegible] 8A TO
104 A where [illegible]
[illegible]

SAMP. [illegible]
[illegible] CONC.
[illegible]
[illegible]

[illegible]
PLANT [illegible]
[illegible]
MONOCOT
(ISOETOPHYTES)


compt. T'ord.
diff
$\beta_{1\frac{1}{2}}$

June 28

6522 NE¼, Sec. 26, T 14 N. R 92 W
in Dunn Co.

Poorly exposed G.U
TYPICAL light grey
KAOLINITIC SS & CLAY
U.M. mostly yellow
non ind. x bedded SS

6523 NE, SW, Sec 23, T 14 N
R 92 W
No ov. here a good
FUL SS. light ACROSS
[illegible]

6524 NE SW Sec 23 T 14 N
R 92 W
[illegible]
FUL G.U. [illegible]
orange [illegible] SS [illegible]

6525 S½, S22 T 14 N R 92 W

F.U. [illegible] & BROWN SANDY
with [illegible]
[illegible] lignite & U, dark
[illegible] SHALES.

6526 [illegible] 6926

same [illegible] KAOLINITE
~~[illegible]~~, G.V. [illegible] SS AS AT
6524 BUT WITH
Orange wh SS [illegible]

SECTION 6527
NE, SW, Sec 22 T147N R92W
n. Dunn Co.

	Golden Valley Fm
	lower contact [illegible]
	F.U. [illegible]
6'	An N-H silty clay
	with mica flakes 23
	(Lower Gray part, still
	wh. color N 7.5
	some [illegible] trash.
	[illegible]
3'	Color [illegible] mica
	still 170 slightly
	silty clay
	Wh. color N 7.5 [illegible]
	small [illegible]
	[illegible]
	H.5 now pure clay. sos.
5'	[illegible] lignite
	in a channel!
	[illegible]
	[illegible] 15'

Sec 65 27.

5.1 Channel of med. gr
Arkose with 1/2 Zonica
fr. col. N-7 wh. col. N 7.5

Channel is Abt 5' Thick
exp. upward to East.

2' west channel
pinches to 1'
carb. [illegible] surface.
middle orange
6' 5Y 7/4 fine to med gr.
L.A. Arkose [illegible]
with [illegible]
contrasting to
areas of 10YR 6/6
limonite [illegible]
in channel contact
but not [illegible]

Channel [illegible]
[illegible]

wh. color 10YR 8/2
12' some lig. material.
in SS.
wh. color [illegible] 5Y 8/1
fr. color [illegible] 5Y 7/2

Sec 6527

[illegible] 0 –

7.5 YR 5/6 sandstone lenses, SS is [illegible], pale [illegible].

~~[illegible]~~ [illegible] TV [illegible]

[illegible] 10YR 7/6

[illegible]

[illegible] 1 – 12' [illegible]

[illegible] [illegible] is [illegible]

Eq – TO [illegible] [illegible]

[illegible] 7.5 YR 8/1

[illegible] 5YR [illegible] TO N9

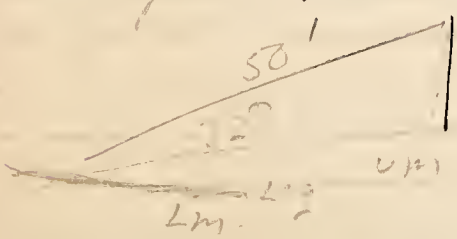
[illegible] Top of [illegible]

6527 A X NENE 35, T 147N R 92 W
n. Dunn Co.

Sequence of mod
s. & to and 1/2 Tomic
X bedded C s channels
over the lower
mbr as des. below.
Color both fr & wn
5YR 3/2

Limonite stain ledges
well
~~Beautifully~~ bedded.
with channel
scour.

Height from Alamo Bluff
Lig.;
channel
descends
another ol.



N S

L. M CUT OUT IN A
CHANNEL TRENDING
90° WITH X BEDDING
AT 165° N 30°

[illegible]

[illegible] 28 T. 47N R 91W

0	[illegible] fm. [illegible] grey 5Y6/1 SITST with some [illegible] MICA [illegible] wh. 0-0.2 5YR8/1 [illegible]
10.2	middle [illegible] 10YR [illegible] wheathe[illegible] vfg TO fg SA, MIC 2%. SS. mostly [illegible] wh. but some [illegible] wh.
11.2	vfg clayey, SA, MIC 1% 5Y5/1 SS. wh. col. 5Y8/1 11.2 UNIT NOW 12- CLAY SITST. 1% MIC

Samp. 6520 364

15' Upper [illegible]
Probably a channel
which has cut
out top of [illegible]
[illegible] slightly.

[illegible]
[illegible]
[illegible]
[illegible] mic. [illegible] is a
[illegible]
[illegible] 21
is 5 yr/z

20.5' Section covered
with 3 lec. [illegible]
do is to here

24' [illegible]

SMP. 625 . 3K

23.3 5Y6/3 SILTY CLAYPPT
CLAY
WH COLOR 5Y 6/3
[illegible] - 26.5

26.5 Vfg, SA, [illegible] VERY
SOFT, 5YR/2 MIC 120
SS,
WH [illegible] 26.5 - 33.2

29.8 [illegible] PLANE
LAMINATED 5Y7/2 SS
WITH 10YR 8/6 LIMONITE
STAINING & CONCS.

31.6 NOW A NON [illegible] 5Y 5/1
SILTST WITH SOME CLAY

33.2 LIGNITE 5YR 2/1

36.4 5Y4/1 fissile SHALE
WITH PL. PENNAINS
CLAY IS [illegible] LIGNITIC
WH COLOR 5Y7/3
36.4 - [illegible]
AT [illegible]

39.3 [illegible]
[illegible]
[illegible] 5½ 5.5/2 with
[illegible]

[illegible] 39.3

[illegible]
[illegible]
[illegible]

[illegible]

[illegible]
[illegible]
[illegible]

SE, NE, Sec 33, T 147 N, R 91 W
M. Dunn Co.

9'

3.5

9.1

CHANNEL CONT

3524 ✓

9 Upper [illegible] of [illegible]
To [illegible]
[illegible]
[illegible] fills in
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
Tillers

7 Middle [illegible]
Wh[illegible] = to
[illegible] from [illegible] to 23
[illegible] 5[illegible]
[illegible]
[illegible] remains in
lower position.

[illegible]
[illegible]
[illegible]
[illegible] through

6528 ✓

[illegible] SYMB/1 to
[illegible]

12. UNIT now a bedded
[illegible]

17 UNIT now 10YR7/5 STRST.

23. Mil. Orange begins
to grade into
Upper Lev.
UNIT now [illegible]
5YR5/5 STRST.
Wh. Color 28 - 28.7
5YR8/1 with dec.
amt of [illegible]
√ Point [illegible]
Towards [illegible]

28.7 Channel fill of
[illegible]
[illegible] poorly [illegible]
[illegible] SS with
Charcoal frags &
[illegible] (1.4.) pebs
Wh. Col 5 X 7/1
Upper Cont. Sharp.

[illegible] Welded tuff [illegible]
the massive [illegible]
[illegible]

31.8 [illegible]
[illegible]
[illegible]
[illegible]

Upper part
[illegible]
with [illegible] phenocrysts

32.6 5Y [illegible] welded
[illegible]

29.8
Whi color ~~[illegible]~~ to top
5Y 7.5/2

[illegible] Unit [illegible]
[illegible]

[illegible] Lim zone [illegible]
[illegible]

✓

[illegible] UNIT 4 [illegible]
5Y5/3 [illegible]

39.3 [illegible] CLAY 5Y5/2

46.2 [illegible] FIAIRE
[illegible] 5/2 ONLY SLIGHT
SILTY CLAY
with pyrolusite
markings.

43. 5Y6/3 f.g. 24.
170 mic 2 min.
CLAYEY CALC SS
UNCONSOL with [illegible]
CALC CEM. [illegible]
showing [illegible]
tr. color. ledges 5Y8/2

44. ledge [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

6529

SE, NW, Sec 11, T 145N, R 90W, n.
Mercer Co.

SECTION begins in F.U.
~~CHAN~~ Fm which is in
Tiger Channel
[illegible]

5 [illegible]
[illegible]
[illegible]
[illegible] CONT
5YR 3/1 with A
[illegible]

15 BASE of channel
[illegible]
A bedded, Lig, Chippy

Add 14° to
vector for

5.

5.9

6.8.

7

TRUE N.

N 7.5

15. SILTY but SAME UNIT
AS S. [illegible] COLOR N 6.5

wh. col. [illegible] MOTTLED
WITH. 8YR 6/6 from 15-16
forming [illegible] ZONE
AT THIS LEVEL.

[illegible]

[illegible]

[illegible] Upper [illegible]
[illegible] carb
[illegible]

[illegible] - 2815
[illegible]

[illegible] carb [illegible]

[illegible] very carb. [illegible]
[illegible]
with pieces of carb
[illegible] "Adamo bluff Lignite"

2816 Upper Mbr.
[illegible] LTST
with lots mica &
carb. frags. color.
5Y7.5/2

58.5

12.55 [illegible]
Color. 10YR 4/2

6 5

38. Only now A [illegible]
SA only slightly
clayey [illegible] SS
[illegible] unind.
mica ppo.
Col. smeared with
some [illegible]
[illegible]
Some carb trash

40.7 Mod [illegible] unind. SS.
[illegible]

41.9 DISCONT 4" ledge
of 5YR 6/6 limonite
cemented ss.
B" med. SA. 17. mic

43 SAME UNIT AS
40.7 Colors of
both. N 7.5
[illegible] 4"

43.8 Humus layer of
old soil. Carb
matter increases upward
[illegible] contact med
[illegible] soil.
[illegible]

← 44.8 5Y 6/2 [illegible]
[illegible]

48 Same as 44.8

16.5 5 lb mic, 5 lb/=
bedded, layer [illegible]
mic. on top.

50.5 [illegible]
[illegible]
[illegible] and
very clayey
[illegible] 5 lb/3
[illegible] 50 on one
[illegible] mostly + vfg
[illegible] layer no s/t.
[illegible]
some [illegible]

[illegible]
[illegible]
[illegible] bec
[illegible]
[illegible]
[illegible]
some limon
[illegible]

[illegible] Fissile shale @ N 6.5.
with fer [illegible]
shale with [illegible]

r/s & poorly frags on irreg
h.p/s some slickensides

57.7 - 57.9 Good w/ lignite

outsin. top.
57.9 + 5Y4/1 & 5Y5/2 slightly
5.7Y unbedded sh.

58 Bedded 1/2 IN 5Y7/1
1% MICA ON B.P.
5Y4/1.

wh. color.
57.9 TO TOP. 5Y7/3

60 + Thinly bedded
[illegible] layer
[illegible] SS

65 [illegible] NOT
well bedded
[illegible] lignite
[illegible]

64. fg, SA bedded.
[illegible] 5Y5/2
SS. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

72. SAME AS [illegible]

[illegible]

76. TOP [illegible]

[illegible]

TOP.

June 30

630 SE 1/4, Sec 10, T 14 S N
R 9 W Billings Co.

[illegible] SECTION G.V.

10' Mid orange
5' [illegible]
[illegible]
Upper [illegible]
Jun. [illegible]
[illegible] upper [illegible]
Lig present [illegible]
Poor spectrum.

631. ~~[illegible] 2~~ NW, Sec 11 Billings Co.
[illegible] 14 S N, R [illegible]
Good [illegible]
Fl. Con[illegible] + Most of
[illegible]
Upper [illegible]
[illegible]

[illegible]

6532 [illegible]

x possible [illegible]
x bedding [illegible] slumping on
x bedding

more following 6546

6533 SE, SW, [illegible] T 143 N
R 99 W Billings Co.

H S Lewis

6534 [illegible]

S ⅓ McKenzie Co.

6535 NW, Sec 11, T 143 N, R 99 W, S ⅓ McKenzie
Good [illegible]
TAKE HERE!

Center N ½, Sec 10, T 147 N, R 100 W.
S ½ McKenzie Co N. D.

Fairfield, Hyde

July 1, [illegible]

[illegible]

NW, Sec 11, T 145 N, R 99 W, S 1/3 McKenzie Co.

[illegible]

15

[illegible]

– 15' to – 18' below

[illegible]

Carb. Sh.

8

G. V. Lowe

[illegible]

[illegible]

[illegible] undistorted [illegible]
with color [illegible] - 30.6
[illegible] 2.5

[illegible]

30.6 [illegible]

[illegible]

Ash [illegible]

well cemented by limonite

ridge of [illegible]

[illegible]

31.5 A [illegible]

[illegible]

for coh. sylvi

[illegible]

35. A [illegible]

[illegible]

35. [illegible]

[illegible]

[illegible]

55

√

[illegible]

[illegible] color [illegible] top.

[illegible]

6 [illegible]

[illegible] 37°

[illegible]

[illegible] zone of

[illegible]

This [illegible] probably

[illegible] somewhat

[illegible]

7/2

531 NW, NE, Sec 29, T 145N, R 98W
S. McHenry Co

Upp LAV. 4'
Alamo Bluff

7/2

Baskin Ridge

6538. SE, SE, Sec 20, T 145 N, R 98 W.
S. McKenzie Co.

0'

1/2 To

4.5

To NR, Through A 1ft
INTERVAL

7.5

middle Brown Quartz
with l. grey

[illegible]

[illegible]

[illegible]

Wh. color [illegible]
[illegible] 4mts
of [illegible] 9' - 12.4'
INIT same [illegible] as
[illegible] with areas
of sy 6/3 limonite se

Sample

Ropey twisted limonite
cones. found all through
[illegible] of sample 38 a.
as well as limonite
spherules
and spherule
aggregates between
11 & 12.4

Lower Mbr.

Very silty [illegible]

[illegible]

13' [illegible]

Alamo Bluff lignite [illegible]

Upper Mbr.

Very local [illegible]

The lignite

Fr. Col. [illegible] 1/2

Sh. Col. [illegible] 1/2

[illegible] 6/2

17.3 [illegible] silty, [illegible]

[illegible]

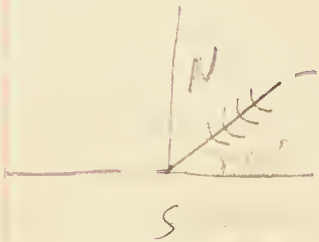
23 [illegible]

MICACEOUS [illegible]

L.B.

NE, NE, Sec 11, T 145N, R 99W
S. McKenzie

NE, NE, Sec 11, T 145N, R 99W
S McKenzie Co.



Channels
9 Arci of X bels

6540

[illegible]

[illegible]

[illegible]

[illegible] [illegible]
6535] now 3 ft Thick
Ash grey well sod

No [illegible]

[illegible]

[illegible] = [illegible]
[illegible] Sh
[illegible]

L.B. of Sec [31.5 of Basal 65 38]

Grey SS [Dr. 1 + 6538]

Ash Grey SS

Section [illegible]
SW, NE, Sec 14, T 145N, R 99W.
Lazy Butte.

SECTION STARTS IN G.V.
CONTACT WITH F.U. IS
[illegible]

0 G.V. lower grey
partially [illegible]
[illegible] vfg
amp. [illegible]
GSHO-(a) D med, s.a. [illegible] mic
NON CALC, SS with
carb trash frags, &
[illegible] (pieces, (meta seg.)
fr seg

wh. [illegible] lower 1' 5Y 7/2
upper 5YR 6.5/1
[illegible]

[illegible] Unit [illegible] [illegible]
[illegible]
fr. c, [illegible] 6.5/2
[illegible] 1/5 [illegible], [illegible] sc[illegible]
[illegible] 3/3-7

[illegible] unit no, carb [illegible]
[illegible] rem. fr. col. 5Y 7/2

15

[illegible] 8-15 [illegible]
[illegible] 5YR 7/0 [illegible] 5YR 8/1

This [illegible] 3, [illegible]
[illegible] found in places
which more [illegible]
at this level. [illegible]
The ~~massive~~ [illegible]
[illegible]

~~7.5 [illegible]~~

9.5 Unit [illegible] vfg. [illegible] 1/2 70
[illegible] ind. [illegible] ve SS.
fr col 10YR 7/6

14. vfg. SS, KAOLINITIC 1/4 70 mic.
fr. col. 3YR 7.5/1 UN ind.
SS forming stp sided cliff.

Wh. color 3YR 7.5/1 14-21
INTER [illegible] WITH lower
[illegible] at 15.

16. [illegible] SS (massive) same colors.
1/2 70 mic.
middle orange.

19'10" Sharp CONTACT WITH
very resistant SS. ledge
[Ashy grey SS.]

[illegible] med gr. very
lignitic, [illegible] with
charcoal frags. frag.
curv. [illegible] or
rimowite. Thin to med
[illegible] with [illegible]
[illegible] very.
fr. col. 5YR 5/2

wh. col. 10YR 6/2
19'10" - 22.3.

22.3, Upper better ind.
non calc. ledge of
unit 19'10". Same with
less lignitic, some
charcoal frags
fr. Color. 10YR-6/2
wh. color. 5YR 7/1

[illegible] med. [illegible]
silty [illegible] 10YR 6.5/2

wh. col.
[illegible] 22.3 - 28
2YR 7/1

29' MASSIVE very well ind.
non calc, vfg SA SS.
fedge
fr. color. 10YR 7/5
wh. color 10YR 6.5/6
28.3 - 31.8 mottled with
5YR 7/1
This is the only orange
[illegible]

upper lavender

32. 10YR 6.5/2, massive somewhat
lignitic silt, with carb
lignitized stem remains.
Wh. color 32 - 36 - 5YR 6.5/1
Unit becomes darker &
[illegible] spotted.
34.2' unit same with
pl. rem. (poor)
fr color. 5YR 4.5/1
[illegible] Bluffing

35. Lignite (~~Alamo Bluff~~)
5YR 3/2 [illegible] 1" layer
with gyp.
[illegible] at top
~~Upper Mbr~~ [illegible]

35.5 Slightly silty ~~massive~~ Bedded fissile sh
5YR 6.5/2 ~~clay~~
wh. color 35.5 - [5YR 7/1

37.1 Paper Thin 5YR 4/1, fissile
Lign [illegible] sh.
37.1 = 51
Wh. Color 5YR 4/1 [illegible]
based [illegible] to
[illegible] 5YR 5/6 + [illegible]
more [illegible]

40 4- [illegible]
[illegible]
[illegible]
[illegible] 3Y 5/1

41.2 Same [illegible]
[illegible]
[illegible] 5/6
[illegible]

43. Same [illegible] 4 5 = 37.1

50.6 fissile [illegible]
[illegible] 5Y 6.5/2

[illegible] color 50.6 5Y
10YR 5/3

54.4 5Y6 7/1

[illegible] grades upward
into a massive
[illegible] carbonaceous
[illegible] plastic
[illegible]
L.B. bed. [illegible] N 2.5
[illegible] to
pre [illegible] color.

54.5 5Y 5/2 clayey 270 mic.
Bedded [illegible]

[illegible]

[illegible] 54.5 5Y7/1
to top.

60.8 PLASTIC 5GY4/1 CLAY
63' unit now a silty
clay [illegible] than
60.8 [illegible]

63.2 Ledge of well indurated
3Y 8/1 calc-cem. 270 mic.
vfg. sa. [illegible]

Wh. Color 10YR 6/3
This is SS which
caps Grassy BUTTE to
N.

65 [illegible]

Top of Butte
[illegible]

6 S 39. GRASSY BUTTE.

STRIKE & Dip. READING ON X. bedding. Some SLIMPING NOTED. & EFFORT MADE NOT TO INCL. SUCH BEDS IN READING.

Axis of 10 Selected Lineations

Are fold Axes
MAJOR.

1. 29° Azimuth
2. 28°
3. 29°
4. 36°
5. 28°
6. 21°
7. ~~216~~ 036
8. 33°
9.
10.

A. lineations

Also joints
are
II This
set

X Beds.

1. 57° Dip 20° W
14
71

2nd set of joints.

Joint (Gr. set) [illegible]
[illegible] ⊥ to folds shown on
previous page
~~117°~~
~~90°~~
(151°)

B lineations: Joints + cross-folds
Joint: 117°
Joint: 90°
Axis of x-fold: 114° ↘ N
Joint: 125°
Joint: 120°
Joint: 121°
Joint: 121°
Joint: 114°
Joint: 119°
Joint: 110°
x-fold: 110°
x-fold: 124°
Joint: 115°

B lineations (cont.)

118° x - [illegible]

110° x - [illegible]

[illegible] [illegible] [illegible]

c cryl. in the s.s.

6541 NE, NW, Sec 11, T 143N, R 99W, Billings Co.

[illegible]

[illegible] 5 1/2 TO 5 1/03 [illegible]

0'

[illegible]

[illegible] MASSIVE [illegible]

[illegible]

[illegible] 5 1/2 [illegible] SCHT

[illegible] TRASH [illegible]

[illegible] 6541-a

[illegible]

9 [illegible]

[illegible] color 5Y 6/1
laterally from 8-12
[illegible] of seat
fe-mang concs.

17. Same [illegible]

18.5 Golden valley Fm
L. mbr. L. grey
contact [illegible]
[illegible]
[illegible]

2GY 5/1 [illegible]
[illegible]
some [illegible]
wh. 18.5-21.5 [illegible]

[illegible] some [illegible]
some [illegible] thin limonite
st [illegible]
[illegible]
[illegible] Thin.

12
.3
.6

21'
[illegible] on bp.
UNIT 4 CLAY WITH only
[illegible] BANDS of [illegible]
[illegible] COLOR N 6.5

Wh. [illegible] 2115 - 2815
N 7.

215 [illegible] SAND WITH [illegible]
[illegible]
[illegible]
UNIT [illegible]
[illegible] 215

[illegible]

[illegible]

[illegible]

Middle [illegible]
Cent. Ark.

216 VERY FISSILE SHALE, N 6.5
SH. WITH SOME 1/6 LAYERS
[illegible] JOINT [illegible]

[illegible] color 28.8 - 35.8
5Y 6/3

[illegible] 1 [illegible]
[illegible] 10YR 7/6 with some
[illegible]
[illegible]

32. SITST, [illegible] mix.
[illegible] sphe., [illegible]
60' 30.2

[illegible]
[illegible] color [illegible]
[illegible] color 35.8 - 37.
5YR 5/6 [illegible] with
10R 7/6

37. [illegible]
clay.

[illegible] 41.5
10YR [illegible]

4115 Up. Lavenlor
C/ [illegible] MASSIVE
[illegible] N 1.5
[illegible] 7/1
[illegible] 2V8 7/1

4515 Upper Mbr [illegible] Channel
which [illegible] OUT
ALUMS [illegible] Eng.

Present 75' WEST.
[illegible] AT 51
There's [illegible] over 6,Th
do st [illegible] "4" ~~[illegible]~~
leases [illegible] "15" [illegible]
Dimensions
"15" [illegible]
ABOVE IT The fine grass of 65 Lot 65

[illegible]

CLAYEY [illegible] MASSIVE
SY 6/1 [illegible] 1 Th
10YR 6/6 [illegible] ST.

[illegible] color [illegible] - [illegible]
[illegible] with
experiment. of
Board HDT - 49.8 which [illegible]
[illegible]

[illegible]
[illegible]
[illegible]
[illegible] very [illegible]
[illegible]

[illegible] Vat with [illegible]
[illegible]

[illegible] Abbey [illegible]

[illegible]

✓

5542 [illegible] No. of 5542

NW, NW, Sec 11 T 143N R 99W
~~at~~ Billings Cr.
NO This is lower 1' of U.M.

(Lignite zone)
[illegible] extremely resistant
[illegible] friable
TUFFACEOUS [illegible] UNIT
with [illegible]

This forms extensive
[illegible] surfaces
[illegible]
QUARTZITE is uppermost U.M.
Above lignite
[illegible] lower mbr.

fr. [illegible] TO N8
with MOTTL.
wh. 5Y7/2 TO 10YR7/4
TO 5Y 5/2

[illegible] sections 5543
to 5547 6541
[illegible] v. [illegible]
[illegible] v. [illegible]

Shows that quantity
of [illegible]
[illegible]
[illegible]
[illegible]
[illegible]

[illegible] v. [illegible]
[illegible]
[illegible] 41.

[illegible]
[illegible]

[illegible] 5543 5542, [illegible]
[illegible] [illegible]
[illegible] 5543(2)
This is also [illegible]
[illegible] equiv.
[illegible] mbr. [illegible]

[illegible] 54, [illegible] pure
[illegible] 5542. very
[illegible]

This act [illegible]
a [illegible]

Literally becomes
forms and cemented into
[illegible] hard siltite
[illegible] powder
[illegible]
[illegible] slightly [illegible]
wh color 2.5Y 7/2 - 5/4
5Y 7.5/2

[illegible] slight [illegible]
[illegible]

50.8 [illegible] 2/1, Lignite
[illegible] jarosite [illegible] contact
[illegible] xls.

51.4 [illegible], poor [illegible]
[illegible] sh.
Lt. color 10YR 6.5/2

wh col 51.8 [illegible]
5YR 7/1

55.0 [illegible] sh
water [illegible]
[illegible]

Sf.3 somewhat more plastic
gyp vl. bearing
fpl. rem bear. fissle
sh.

Sf.2 Vfg, very clayey,
unind., SA,

654H SE, SW, Sec 4, T 143N, R 98W.
Billings Co

Hill of S.B. Sh capped
by an X bedded, med.
SS 70 [illegible] [illegible]
[illegible] well cem.
non [illegible] SS
[illegible]
SS [illegible] [illegible]

6545.A SE, SW, Sec 13, T 140N, R99W
Billings Co.

F.V. SB. sh on a hill
capped with concretions
ss. considerably below
m.o. of G.V. & of
ss of LOC. 6532

This

✓

ABC 6532

[illegible]

[illegible] ATTITUDES

Y b[illegible]

[illegible]	[illegible]° Dip [illegible]° NE	[illegible]	[illegible] N
[illegible]	130° Dip N	[illegible]	[illegible]
[illegible]	[illegible] 16° N	[illegible]	[illegible]
[illegible]	115 N	[illegible]	25[illegible] N
[illegible]	272° N	[illegible]	[illegible]
[illegible]	259° N	[illegible]	31[illegible] N
[illegible]	[illegible] N	[illegible]	283 N
[illegible]	[illegible] N	[illegible]	306° N
[illegible]	[illegible] N	[illegible]	263° N
[illegible]	26° N	[illegible]	[illegible] N

329° N	[illegible] N
323° N	6[illegible]
332° N	98° N
[illegible]	80° N
85° 15° N	76° 25° N
279 N	69° N
98° N	87° N
[illegible] N	1-2 N
[illegible] N	[illegible] N
[illegible] 16° N	[illegible] 2° N

22° N	[illegible] N
123° N	296° N
[illegible] N	274° N
95° N	264° N
[illegible] N	[illegible]

Channel [illegible]

1. 32°
2. 157° ([illegible])
3. 356° ([illegible])

2. [illegible]°

[illegible]

[illegible] 7/4 [illegible] 5[illegible]/1

3. [illegible]
4. [illegible]
[illegible]
6. 58°
7. 241°
8. 227°

B.

3 N R

SA. "THE" ARENITE" WITH

WITH

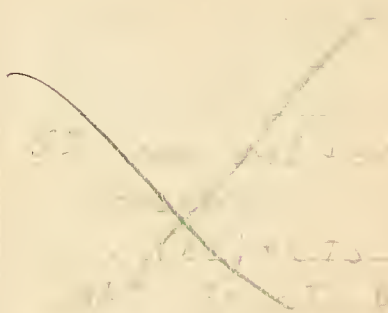
10YR 5/4

136 N

Upper is welded
[illegible] and 5872
270 mile, cable con-
[illegible]

This could be a
channel dipping [illegible]
E. [illegible] at 6532
Level line to 6532
passes at least [illegible]
above top of [illegible]
[illegible]

[illegible] 6532 Approx.



[illegible] 50

[illegible] 70

[illegible] at same level
[illegible] 4115
[illegible] 1 ch. [illegible] 55
[illegible] 14
[illegible] of Fe. [illegible]
[illegible] 55

2. SOME SE [illegible]
AT [illegible] [illegible]
T 14 3N R 9W.

9 IS ABOVE THE
Alamo Bluff [illegible] IS
AT LOC 65 H7
SW/SW SEC 30 T 14 3N R [illegible]
[illegible] AS ~~ACCESS~~
[illegible] [illegible] [illegible] UNV.

w. Morton Co.

NW SE, Sec 9, T 140N, R 58W.

[illegible]

w. Morton Co.

[illegible]

GRAN 8470

AS 92

6550 [illegible] SE NE Sec 35, T 141N

R 58W s. Mercer Co.

LINE [illegible] TOPS

[illegible] are comp.

of laid [illegible]

blocks but at base

[illegible] of which abt

2% [illegible]

[illegible] are found

Not believed LAG

deposits [illegible] Benson

BUT MORAIRAI

THIS

CSSI

v. Merar Co.

GSSI

v. Morton Co.

V. M. G V. JUST ABOVE

TIMTOF 2-11-11

Open nbl. L. I

41 From Top of V. M. GT

2-11-11

The Act to

Com. Here is

COM IS A FRIABLE 5 V 6/2

IN THE

2-11-72

[illegible]

Kaolin [illegible]

X bedded [illegible]

[illegible] W, Sec [illegible], T 143N R 94W

Hills of SB. covered with residuum of G.V. silicified [illegible] of A.B. Hor.

Hills [illegible] High [illegible] Thus [illegible] G.G. [illegible] X [illegible] 55 but STR. [illegible] it Above

7/8/6

[illegible]

[illegible]

Not truly transitional when seen in det. section

TRANSITIONAL E.K.S.

[illegible]

6555. Center Sec. 6 T 143N, R 91W

S. Dunn Co.

Poor exp. of what may be a consolidated u. m. ss.

[illegible]

6556. Poor G.K. ss. u. m. sect

[illegible] Sec. 7, T 143N R 91W

S. Dunn Co.

SE, NW, Sec 20, T 143N, R 91W

6557 Poor sect. Obscure
marker of G.V.
No sect. pos.

6558-7 NW, [illegible] T 143N, R 91W
Possible G.V. sec. over
A cliff which cannot be
seen.

6559 SW, SW, Sec [illegible] T 143N, R [illegible] W
No [illegible] possibly
G.V. sect. in A Valley

7/9/65

5554 [illegible]

SECTION STARTS [illegible] F.V.
THIS IS A [illegible]
THE F.V. ALLUVIUM.
F.V. [illegible]
level is typical [illegible]
[illegible]

---

0 FORT UNION
[illegible] SA, [illegible]
5Y6/1 [illegible]
wh color 5Y7/2 0-15

[illegible]
[illegible] 5Y5/5

5 5Y5/2 SILTY CLAY
MASSIVE

9' N3 SILTY, [illegible]
MASS. CLAY

[illegible] 5Y 5/6 Chippy Sh
STAINED

6550

10.4 [illegible]

[illegible] WITH
[illegible] 6/6 [illegible]
[illegible]

AT 5YR3/4 [illegible]
[illegible]

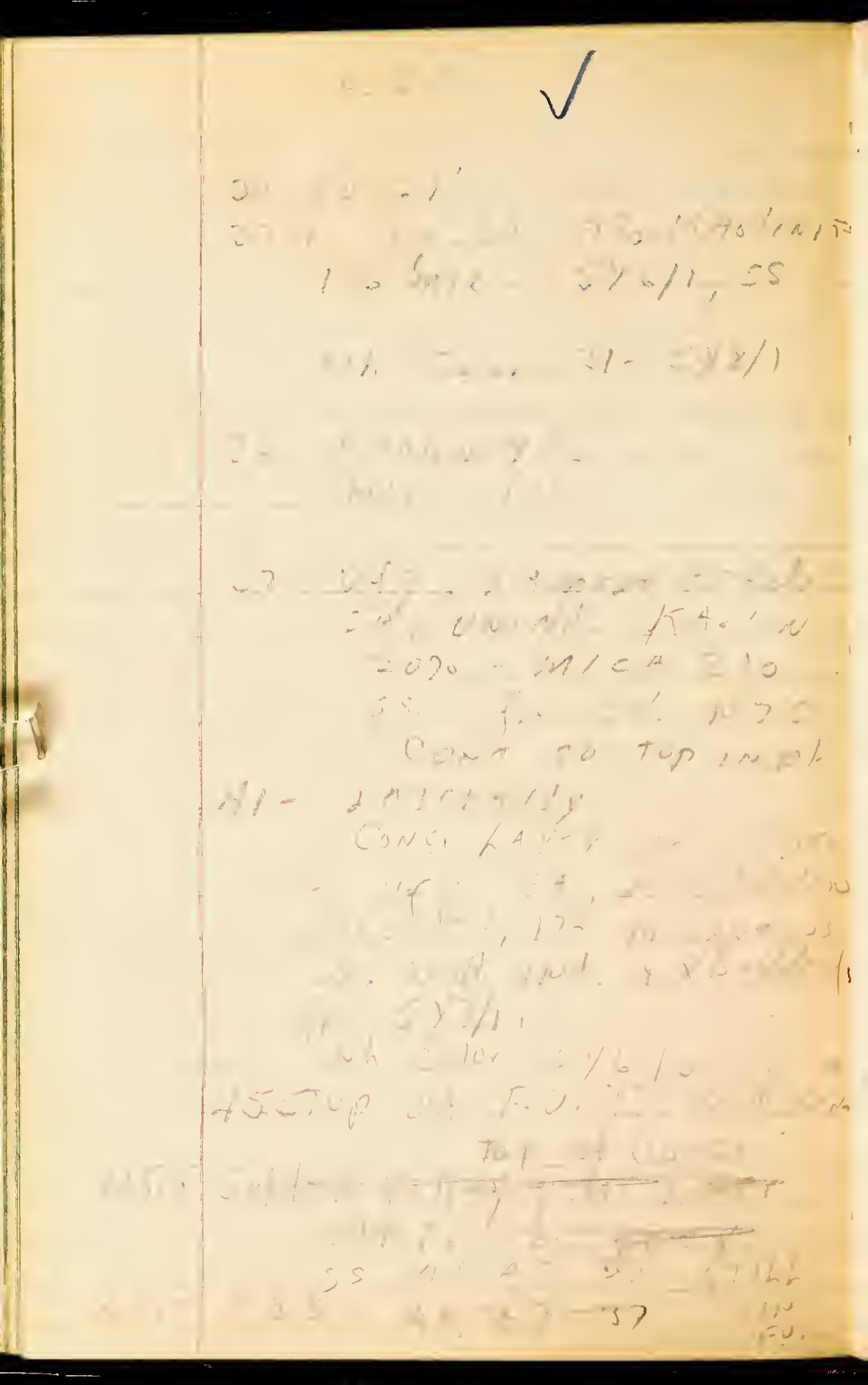
15.9 [illegible]

[illegible] 5Y7/2
WOW MIC SS-31
[illegible] 15- [illegible] 5Y8/1
[illegible]

21 [illegible]
[illegible] >170
[illegible] 5Y6/4

[illegible]

27' 5Y7/3
[illegible]



47.7 [illegible]

46 [illegible]

middle [illegible]
75'
5
0

30' [illegible]

26" [illegible]

[illegible]

~~Typ~~ Cones. Color [illegible]
& 5Y 2/1 [illegible]
[illegible] TYPICAL F.V.
NOT L.M. F.V. Cones.

68.5 [illegible]

70

13 - do 72'

14.6

151

78

MOI BEARS

78

83 Upper LAV

✓

[illegible]

[illegible]

105 Upper Dr.
[illegible] shale

[illegible]

[illegible] 47

[illegible] SA [illegible]
[illegible]
[illegible]
[illegible]
[illegible]

93 well indurated ledge of
[illegible] bedded (x bedded)
[illegible] calc cem [illegible]
[illegible] SA [illegible]

97 [illegible] pit [illegible]
[illegible] AS 91

✓

[illegible] Tin [illegible]

[illegible] large [illegible]

far down 1½ cm.

[illegible] CLAY

[illegible] but wh

enough to be orange

[illegible]

78.5 Upper lobe channel

fissle [illegible]

[illegible] 5YR 5/2, [illegible]

[illegible] mic.

wh color 78.5-90 5Y 7/2

82.4 N.5 Aphanitic dense

fr [illegible] ls.

wh color 5Y 7/2

83. Pelleted, 5Y 5/2 etc. Asat

78.5

Some lim. cim

sist [illegible]

✓

98. [illegible] 770 MICA
[illegible] AS below

91.5 LIGNITE.

[illegible] [illegible], 5Y5/1
CLAY - with some
orange [illegible]
Poor Pl. REMAINS -
wh color 93.5-70 P
5Y 7/2

96. [illegible]
CLAY 5Y 5/6 & [illegible]
[illegible] SEAT ZONE of 1-3 ft [illegible] 15 CINCS.
99 SILTST MASSIVE MIC.

[illegible] ARE POOR HERE.
[illegible]

101.5 LAMINATED, 5Y 6/4, 2 MIC
CLAYEY WIND - UP
[illegible]
[illegible]
103.7 SAME LITH 101.5
COLOR 5Y 6/1

[illegible]

106 [illegible] f. SA, [illegible]

106.2 [illegible], STUCCO
very gypsiferous, 5YR 6/1
CLAY

109 Xf. g. SA, UNWL
[illegible] MIL, [illegible]
SA [illegible] CAL. 5YR 7/2
10YR 6/6 [illegible] LIT. [illegible]
[illegible] BASE [illegible] THIN
[illegible]

110.2 INL [illegible] 2-4" THICK
VERY DIS CONT
LAT.

110.4 SAME AS 109

117. GRASS [illegible]
END OF SPIT
CALAMOVILFA
STIPA COMATA

Friday
June 25th Dr. Dorf will
call. 9:00 P.M.

MINIATURE

PERSONAL ACCOUNT BOOKS

for home and office

★

NO. 2044 OPEN STOCK

in following rulings

JOURNAL • CASH • S. E. LEDGER

RECORD • D. E. LEDGER

★

NO. 2044-A ASSORTMENT

consisting of

3-JOURNAL 3-CASH 2-S. E. LEDGER

2-RECORD 2-D. E. LEDGER

VERNON ROYAL LINE

Made in U.S.A.

Add 14° for True N.